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What are speech recognition systems?

Speech recognition,( also known as automatic speech recognition or computer speech recognition[[1]](#footnote-1)) is the ability of a program or a machine to convert words and phrases in spoken language to a machine-readable format. Dictionary defines speech recognition as, " the computerized analysis of spoken words in order to identify the speaker, as in security systems, or to respond to voiced commands: the analysis is performed by finding patterns in the spectrum of the incoming sound and comparing them with stored patterns of elements of sound, as phones, or of complete words[[2]](#footnote-2)". It also can be defined as," Computer technology that enables a device to recognize and understand spoken words, by digitizing the sound and matching its pattern against the stored patterns[[3]](#footnote-3)"

Speech recognition is a broad term with many applications in different fields. The first speech recognizer appeared in 1952 and since that time, it has been developing to match people's needs and provide them with many advantages that will be mentioned later. Most systems must be "trained," requiring samples of actual words that will be spoken by the user of the system, but not of every word. These samples stored in the computer and used to match against future words. Yet other systems aim to be "speaker-independent", for example, they will recognize words in their vocabulary from any speaker without training[[4]](#footnote-4).

Converting a speech waveform into a sequence of words involves several essential steps:

* Training,
* Microphone selection,
* Cognitive abilities,
* Environmental area,
* Consistent speech.

Voice recognition:

Many websites consider speech recognition and voice recognition as one application or one system. However, some websites mention key differences between speech and voice recognition and highlight each one's areas of applications.

* "The term "voice recognition" is sometimes used to refer to speech recognition where the recognition system is trained to a particular speaker - as is the case for most desktop recognition software; hence there is an element of speaker recognition, which attempts to identify the person speaking, to better recognize what is being said. Speech recognition is a broad term which means it can recognize almost anybody's speech - such as a call-centre system designed to recognize many voices"[[5]](#footnote-5).
* "Voice recognition is a system trained to a particular user, where it recognizes their speech based on their unique vocal sound[[6]](#footnote-6).
* "While speech recognition is the process of converting speech to digital data, voice recognition is aimed toward identifying the person who is speaking"[[7]](#footnote-7).
* "Voice recognition works by analyzing the features of speech that differ between individuals. Everyone has a unique pattern of speech stemming from their anatomy (the size and shape of the mouth and throat) and behavioral patterns (their voice’s pitch, their speaking style, accent, and so on)[[8]](#footnote-8).

Benefits and Areas of Applications:

Speech recognition has many benefits which I can't mention all in my paper especially for translators:

* Speech recognition provides translators a tool that may save their times and speed up the translations process.
* Speech recognition technology can also reduce the number of live calls and the amount of time an agent needs to remain on a line. For example, if a consumer is provided the option of gathering the information he needs without accessing an agent, more agents are free to handle calls that cannot be resolved with self-service.
* It allows you to dictate, edit and sign off reports yourself. When you use it, your report is largely populated automatically with accurate information, which further reduces your dictation volume.
* It provides a safe using to Control Music, Navigation and Phone Devices in the Car. For example, when drivers are able to use their voice to select music, input addresses in navigation systems and dial the phone while driving.
* It's very useful for disabled who can't use their hands and use it by their voices instead.

**Application:**

Speech recognition technology has endless applications. It is used for automatic translations, dictation, hands-free computing, medical transcription, robotics, automated customer service, and much more. If you have ever paid a bill over the phone using an automated system, you have used speech recognition software, (Streetdirectory.com)

For example, in the health care area, many electronic medical records applications can be more effective and performed more easily when deployed in conjunction with a speech-recognition engine.

The applications of voice recognition are markedly different from those of speech recognition. Most commonly, voice recognition technology is used to verify a speaker’s identity or determine an unknown speaker’s identity. (Streetdirectory.com)

Further applications:

### Military, High-performance fighter aircraft

### Helicopters

### Battle management

### Training air traffic controllers

### Telephony and other domains

### People with disabilities

### Robotics

### Automatic translation;

### Limitations:

### There are many limitations and challenges of speech recognition. When you start using it, you might be surprised that computers make mistakes and we can't compare them to another person.

### People can talk to each other almost everywhere and filter out noise easily. Speech recognition can't identify what is speech and what is just noise.

"Unlike people, computers need help separating speech sounds from other sounds. When you speak to a computer, you should be in a place without too much noise. Then, you must speak clearly into a microphone that has been placed in the right position. If you do this, the computer will hear you just fine, and not get confused by the other noises around you."[[9]](#footnote-9)

* Speech recognition also can't recognize speech from more than one speaker.
* Speech recognition may write words by the speakers incorrectly is the speaker doesn’t speak very carefully and pause between words.

Examples:

**1) text-to-speech online system(&features)**

<http://say.expressivo.com>

I really like this website because it has an excellent pronunciation

(male or female) with varied dialects of words. Also it provides a program called Expressivo which can provide audiobooks, mails or other documents.

**2) speech-to-text online system**

Speech recognition of windows XP 2007

I tried it myself and I found it very useful even though there are some mistakes because of the misunderstanding of spoken words

2)

### 3) Arabic enabled speech recognition software

### <http://international.sakhr.com/arabic-speech-recognition-and-arabic-TTS.html>

### I didn't find any free website provides Arabic speech recognition. However, I found Sakhr package that develops Arabic Text-to-Speech (TTS) and Automatic Speech Recognition (ASR).

### 4) Speech to Speech

### <http://verbmobil.dfki.de/ww.html>

### Verbmobil "is a speaker-independent and bidirectional speech-to-speech translation system for spontaneous dialogs in mobile situations. It recognizes spoken input, analyses and translates it, and finally utters the translation. The multilingual system handles dialogs in three business-oriented domains, with context-sensitive translation between three languages (German, English, and Japanese.

### Verbmobil is a software system that provides mobile phone users with simultaneous dialog interpretation services for restricted topics, and it provides context-sensitive translations[[10]](#footnote-10).

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### Appendix:

### An interesting Video about how speech recognition works

### <http://www.youtube.com/watch?v=pYu6_cNRCD4&feature=related>

1. Resources:
   * <http://www.businessdictionary.com/definition/speech-recognition.html>
   * <http://www.answers.com/topic/speech-recognition>
   * <http://cslu.cse.ogi.edu/HLTsurvey/ch1node4.html>
   * <http://www.opendl.net/solutions/benefits.aspx>
   * <http://www.tmcnet.com/channels/speech-recognition/articles/20416-benefits-effective-speech-recognition.htm>
   * <http://findarticles.com/p/articles/mi_m0EIN/is_2008_July_8/ai_n27892585/>
   * <http://www.abilityhub.com/speech/speech-description.htm>
   * <http://www.lumenvox.com/resources/tips/uses-of-speech-recognition.aspx>
   * <http://verbmobil.dfki.de/ww.html>
   * <http://www.expressivo.com/index.php?lang=english>
   * <http://www.ectaco.com/info/iTravl-NTL/>
   * <http://international.sakhr.com/arabic-speech-recognition-and-arabic-TTS.html>
   * <http://www.streetdirectory.com/travel_guide/139545/technology/key_differences_between_speech_recognition_and_voice_recognition.html>

1. ### Wikipedia, the free encyclopedia

   [↑](#footnote-ref-1)
2. Dictionary.com. an ask.com service [↑](#footnote-ref-2)
3. Businessdictionary.com [↑](#footnote-ref-3)
4. Dictionary.com. an ask.com service [↑](#footnote-ref-4)
5. ### Wikipedia, the free encyclopedia

   [↑](#footnote-ref-5)
6. Wikipedia, the free encyclopedia [↑](#footnote-ref-6)
7. Streetdirectory.com, Editorials » Technology » Technology [↑](#footnote-ref-7)
8. Streetdirectory.com, Editorials » Technology » Technology [↑](#footnote-ref-8)
9. abilityhub.com , assistive technology solutions [↑](#footnote-ref-9)
10. Mobile Speech-to-Speech Translation of Spontaneous Dialogs:

    An Overview of the Final Verbmobil System ,Wolfgang Wahlster DFKI GmbH, Saarbrücken, Germany [↑](#footnote-ref-10)